

REMARKS

Claims 1-13 are elected for examination.

Claims 1, 2, 4, 6, and 9-12 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. in view of Chen et al.

Dependent claim 3 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. and Chen et al, and further in view of Heshmat et al.

Dependent claim 5 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. and Chen et al, and further in view of Takahashi et al.

Dependent claim 7 and 8 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. and Chen et al, and further in view of Lewis et al.

Dependent claim 13 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi et al. and Chen et al, and further in view of Suzuki et al.

It is noted that the Lewis et al. reference is not listed on the PTO-892 form attached to the Office Action.

Claim 1 has been amended to more clearly define the claimed invention.

Claim 1, as amended, recites a magnetic bearing device comprising:

-a rotary shaft carrying a fan rotating at a variable speed in a chamber holding a variable gas pressure;

-a motor rotating said rotary shaft;

-a magnetic bearing holding said rotary shaft; and
-a control circuit changing a parameter in feedback control performed for holding
said rotary shaft in a position allowing stable rotation of said fan, to a numeric value calculated
based on a load applied to said magnetic bearing.

As demonstrated below, neither the applied combination of Sekiguchi and Chen, nor the other references of record discloses the claimed invention within the meaning of 35 U.S.C. 103.

In the application of a rejection under 35 U.S.C. §103, it is incumbent upon the Examiner to factually support a conclusion of obviousness. As stated in *Graham v. John Deere Co.* 383 U.S. 1, 13, 148 U.S.P.Q. 459, 465 (1966), obviousness under 35 U.S.C. §103 must be determined by considering (1) the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims in issue; and (3) resolving the level of ordinary skill in the pertinent art.

The Examiner contends that Sekiguchi et al. comprises the rotary shaft, motor and magnetic bearing. However, he admits that this reference does not disclose the claimed control circuit.

Chen et al. is relied upon for disclosing this element in FIGS. 1-7. However, the Examiner has failed to point out wherein Chen et al. discloses that the circuits in FIGS. 1-7 operates in the manner required by claim 1, i.e. to change a parameter in feedback control performed for holding the rotary shaft in a position allowing stable rotation of the fan in accordance with a load applied to the magnetic bearing (as the original claim 1 required) or to a

numeric value calculated based on a load applied to said magnetic bearing (as claim 1, as amended, recites).

Considering Chen et al., the reference discloses velocity and imbalance observer control circuits for controlling a journal rotating in a magnetic field based on integration of sensed displacement of the journal (col. 1, lines 38-42). The reference does not suggest changing a parameter in feedback control performed for holding the rotary shaft in a position allowing stable rotation of the fan in the manner required by claim 1. Instead, Chen et al. discloses a feedback loop with a variable gain to control the levitation of the journal.

Chen describes adjusting the gain of the position feedback loop (column 2, line 34) and discloses that a control parameter can be changed. Similarly, Chen discloses that the velocity gain is adjustable. Such an adjustment to the gains is carried out through a potentiometer (e.g. column 2, line 35). Fig. 4 shows the potentiometers 16 and 65, indicating that the gains can be changed. However, the setting of the potentiometers is not changed in accordance with the operating states.

By contrast, the claimed invention requires the control circuit to change a parameter in feedback control performed for holding the rotary shaft in a position allowing stable rotation of the fan, to a numeric value calculated based on a load applied to the magnetic bearing.

The Chen reference does not teach or suggest such a control circuit. Instead, it discloses only means for changing the control parameter.

It is well settled that the test for obviousness is what the combined teachings of the references would have suggested to those having ordinary skill in the art. *Cable Electric Products*,

Inc. v. Genmark, Inc., 770 F.2d 1015, 226 USPQ 881 (Fed. Cir. 1985). In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification. *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1984).

As demonstrated above, neither Sekiguchi nor Chen suggests a control circuit changing a parameter in feedback control performed for holding the rotary shaft in a position allowing stable rotation of said fan, to a numeric value calculated based on a load applied to the magnetic bearing, as claim 1 requires.

Accordingly, a combination of these references is not sufficient to suggest the control circuit operating in the manner required by claim 1. Hence, it cannot be said that the combination of Sekiguchi and Chen describes the claimed invention within the meaning of 35 U.S.C. § 103. *In re Lalu, supra*.

The other references of record also do not disclose the claimed control circuit.

For example, Takahashi discloses detecting motor phase currents for use in control. However, the use of the currents is intended to detect a rotation position. Namely, the use of the currents is intended not to adjust the size of a sine wave but to produce a sine wave for controlling a motor. Takahashi utilizes a feed forward control and makes corrections to the outputs of controllers (14a, 14b in Figs. 5 and 6). However, G and K in Figs. 5 and 6, respectively, are fixed and there is no description of G and K changing in accordance with the control states. Further, Takahashi does not change a coefficient (e.g. a gain) for calculating the control variable. Hence, Takahashi cannot suggest the claimed control circuit.

Lewis describes a convolution (column 18, line 38) but does not teach or suggest processing a control signal. Lewis describes FFT (column 4-7, line 41) and signal analysis. However, a signal is not analyzed in the control loop. Therefore, the reference cannot teach or suggest the control circuit operating in the manner required in claim 1.

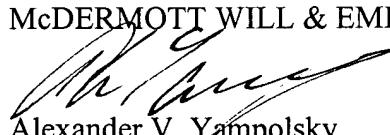
The dependent claims 2-13 are defined over the prior art at least for the reasons discussed above in connection with claim 1. Therefore, Applicant respectfully submits that the rejections of claims 1-13 under 35 U.S.C. § 103 are untenable and should be withdrawn.

In view of the foregoing, and in summary, claims 1-13 are considered to be in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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